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ELLIPTIC ELEMENTS OF COMET *b*, 1898 (PERRINE).

By Heber D. Curtis.

From twenty-four observations by C. D. Perrine, and one each by G. Ciscato and A. Antoniazzi, the following normal places were formed:—

	1898.	α	δ	Obs.
I.	March 22.0	$21^h\ 25^m\ 48^s.47$	$18^\circ\ 46'\ 28''.2$	7
II.	April 28.0	0 18 1 .97	49 13 47 .1	7
III.	June 6.0	3 31 35 .99	56 17 15 .9	6
IV.	July 19.0	5 34 7 .35	53 31 34 .1	6

From these places the following elements were computed:—

Perihelion, 1898, March 17.11895 G. M. T.
Epoch, March 20.0, 1898, G. M. T.

$$\begin{array}{rrrl} M = & 0^\circ & 0' & 25''.4 \\ \pi = & 47 & 18 & 20\ .2 \\ \Omega = & 262 & 26 & 3\ .6 \\ i = & 72 & 31 & 55\ .8 \\ \phi = & 78 & 29 & 56\ .2 \end{array} \quad \left.\begin{array}{l} \\ \\ \\ \end{array}\right\} 1898.0$$

Period 402.789 years.

$\log a = 1.736718$
$\log q = 0.039459$
$\log e = 9.991191$
$\log \mu = 0.944929$

Residuals for the middle places (C — O):—

$$\Delta\lambda' = +0''.2 \qquad \Delta\beta' = +2''.3$$
$$\Delta\lambda'' = 0\ .0 \qquad \Delta\beta'' = -1\ .4$$

Constants for the equator of 1898.0:—

$$x = r\,[9.512398] \sin(23^\circ\ 26'\ 14''.2 + v)$$
$$y = r\,[9.999996] \sin(292\ \ 43\ \ 47\ .5 + v)$$
$$z = r\,[9.975703] \sin(22\ \ 38\ \ 46\ .0 + v)$$

College Park, February, 1899.

OBSERVATIONS OF *MIRA* (*o Ceti*). 1898–99.

By Rose O'Halloran.

As cloudiness prevailed during the summer nights for several successive weeks, satisfactory observations of this variable were not obtained until September 9th, since which date more than ninety estimates of its comparative brightness were made, an opera-glass or a four-inch telescope being used when required.

The general result is conveyed in the following data :

September 9, 1:30 A.M. Equal to γ *Ceti.*

September 18, 11 P.M. Brighter than γ.

September 22, 11 P.M. About midway between α and γ *Ceti.*

September 28, 10:30 P.M. One fourth less than α *Ceti.*

October 4, 2 A.M. Near the meridian the stars seem alike in tint and brightness, though the variable has the lower altitude. This is the highest magnitude it has attained during the maxima of the last five years.

October 12, 4:30 A. M. Slightly dimmer than α.

October 16. Ditto, with equal altitudes and a clear, dark sky.

October 25. The difference has gradually increased, and it is now about one fourth dimmer than α.

November 1. Midway between α and γ *Ceti.*

November 11. It is one fourth brighter than γ *Ceti.*

November 15. In its decreasing stage it again equals this star, classed as nearly of third magnitude.

November 21. In hazy moonlight seems less than γ.

November 28. Midway between γ and δ *Ceti.*

December 3. Equal to δ.

December 8. Half a magnitude less than δ.

December 13. Equal to XI *Piscium* of fifth magnitude, which has a similar reddish tint.

December 18. Barely discernible to the naked eye, but slightly brighter than 69 *Ceti.*

December 26 Still brighter than 69, 70, and the other adjacent stars of sixth magnitude.

January 2, 1899. Equal to 69 *Ceti.*

January 5. Not equal to 69, but brighter than 71 *Ceti.*

January 19. After two weeks of cloudy nights the variable was found to be dimmer than 71 *Ceti.*

January 25. About half a magnitude less than 71.

January 29. Equal to an adjacent star of eighth magnitude.

February 6. Midway between eighth and ninth magnitude according to the D. M. stars in vicinity.

February 18. No noticeable decrease.

March 4. Still of 8.5 magnitude. After this date satisfactory observations were not obtained.

This is the first time for several years that it has been possible to observe the decline to eighth magnitude of this wonderful star. It is of interest to note the unevenness of the pace at which it varied. In its ascending stage it took only twenty-five days to increase from the luster of γ *Ceti* to that of α *Ceti;* but in the process of decline forty-two days were required to sink to equality with the lesser star. When the maximum was past, there was no revival of lost light, except what may be attributed to atmospheric causes; but the decline from fourth to fifth and from seventh to eighth magnitude was more rapid than the intervening variations.

SAN FRANCISCO, March 11, 1899.

PLANETARY PHENOMENA FOR MAY AND JUNE, 1899.

BY PROFESSOR MALCOLM MCNEILL.

MAY.

Mercury is a morning star throughout the month, and comes to its greatest western elongation on May 9th. The planet is then near its aphelion, and the apparent distance, 26°, is quite large, but since the planet is about 10° south of the Sun the interval between the rising of the planet and sunrise will be only about an hour, and *Mercury* cannot be seen except under very good weather conditions during the first half of the month.

Venus is a morning star, and throughout the month rises about $1^h 20^m$ before sunrise. It is moving eastward and northward through the constellation *Pisces* into *Aries* with a velocity just a little greater than that of the Sun's apparent motion among the stars, the total distance traversed being about 35°.

Mars still remains in good position for evening observation, and does not set until after midnight until nearly the end of the month. During the month it moves about 15° eastward and 5° southward from the constellation *Cancer* into *Leo*, from a position near γ *Cancri* to a position 5° west and 3° north of *Regulus*, the brightest star in *Leo*. Its actual distance from the Earth keeps on increasing at the rate of over 20,000,000 miles per month, and it is losing constantly in brightness.